



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
09.05.2007 Bulletin 2007/19

(51) Int Cl.:
B63H 21/30 (2006.01) B63H 23/08 (2006.01)

(43) Date of publication A2:
22.03.2006 Bulletin 2006/12

(21) Application number: **05290489.3**

(22) Date of filing: **04.03.2005**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR LV MK YU

(72) Inventors:
• **Nakagawa, Shigeaki**
Amagasaki-shi, Hyogo-ken (JP)
• **Imanaka, Toshio**
Amagasaki-shi, Hyogo-ken (JP)

(30) Priority: **21.09.2004 JP 2004273328**

(74) Representative: **Lhuillier, René et al**
Cabinet Lepeudry,
43, rue de la Brèche-aux-Loups
75012 Paris (FR)

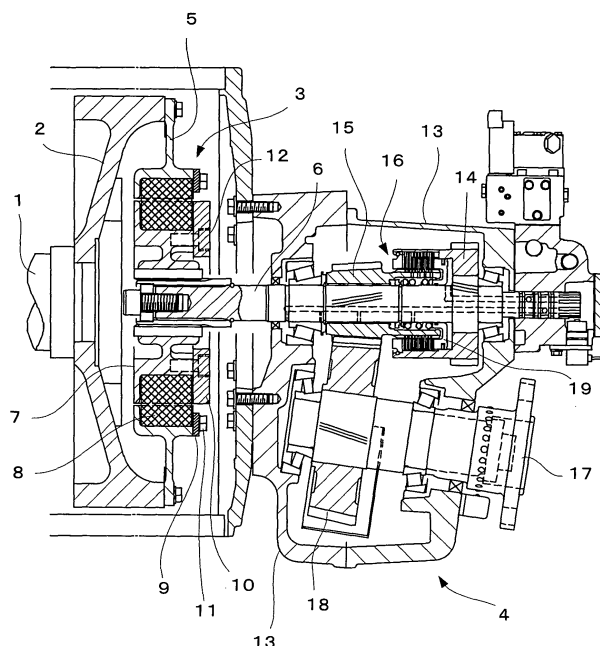
(71) Applicant: **KANZAKI KOKYUKOKI MFG. CO., LTD.**
Amagasaki-Shi,
Hyogo-Ken (JP)

(54) **Method to assemble marine drive system, and marine propulsion apparatus**

(57) The present invention provides a method to assemble a marine drive system wherein an acceptable-unacceptable criterion on the torsional vibration of a shaft of the marine drive system is established based on the correlation between the torsional stiffness of a propeller shaft and the moment of inertia of a propeller; a desirable component for the marine drive shaft is selected based

on the criterion; and the marine drive system is assembled by using the selected components, the marine drive system comprising a flywheel 2, a marine reverse and reduction gear 4, and a elastic coupling 3, whose property are changeable, lying between an input shaft of the marine reverse and reduction gear 6 and the flywheel 2; and the component for the shaft of the marine drive system is the elastic coupling.

Fig. 1





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 29 0489

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	A GROUP OF AUTHORITIES: "MARINE ENGINEERING" 1971, THE SOCIETY OF NAVAL ARCHITECTS AND MARINE ENGINEERS, NEW YORK N.Y. U.S.A., XP002426410	1-4, 10-13	INV. B63H21/30 B63H23/08
Y	* page 388 - page 393 *	5-9	
X	DE 196 23 184 A1 (HERWARTH REICH GMBH MASCHINENF [DE]) 18 December 1997 (1997-12-18)	14,15,17	
Y	* the whole document *	5-9,16, 18	
X	GB 983 521 A (CESKOSLOVENSKE ZD Y NAFTAOVYCH) 17 February 1965 (1965-02-17) * the whole document *	14	
Y	EP 0 861 993 A2 (DENSO CORP [JP] DENSO CORP) 2 September 1998 (1998-09-02) * column 10, line 2 - line 11; figures 1-19 *	16,18	
A	US 2 326 450 A1 (FAWICK THOMAS L) 10 August 1943 (1943-08-10) * page 1, left-hand column, line 40 - right-hand column, line 4; figures 1-4 *	16	TECHNICAL FIELDS SEARCHED (IPC) B63H F16D
A	EP 0 902 204 A1 (KIRSCHHEY CENTA ANTRIEBE [DE]) 17 March 1999 (1999-03-17) * the whole document *	1-18	
A	US 2002/132673 A1 (TABUCHI YASUO [JP] ET AL) 19 September 2002 (2002-09-19) * paragraph [0051]; figures 1-9B *	1-18	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 23 March 2007	Examiner DE SENA HERNANDORENA
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

1
EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 29 0489

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

23-03-2007

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 19623184	A1	18-12-1997	NONE	
GB 983521	A	17-02-1965	CH 413512 A	15-05-1966
EP 0861993	A2	02-09-1998	DE 69801385 D1	27-09-2001
			DE 69801385 T2	06-12-2001
			JP 3446538 B2	16-09-2003
			JP 10299855 A	13-11-1998
			US 6110061 A	29-08-2000
US 2326450	A1		NONE	
EP 0902204	A1	17-03-1999	DE 19739334 A1	25-03-1999
			US 6244964 B1	12-06-2001
US 2002132673	A1	19-09-2002	DE 10211048 A1	26-09-2002